predetermined reference value, that is, whether or not the calculated distance to the detected object is in a prescribed short range. In the case where the calculated distance to the detected object is shorter than the predetermined reference value, the program advances from the step 131 to a step 135. On the other hand, in the case where the calculated distance to the detected object is not shorter than the predetermined reference value or in the case where a detected object is absent, the program advances from the step 131 to a step 133.

The step 133 sets the pulse-width control signal to the state corresponding to the predetermined large pulse-width. After the step 133, the program advances to a step 140.

The step 135 sets the pulse-width control signal to a state corresponding to a predetermined small pulse-width narrower than the predetermined large pulse-width. After the step 135, the program advances to the step 140.

The step 140 sets the power control signal into the state corresponding to the normal power. After the step 140, the program advances to a step 150.

The step 150 outputs the light-emission start requirement signal and the pulse-width control signal to the signal generation circuit 40 (see Fig. 1). Therefore, the pulse generation circuit 40 outputs a pulse of the transmission signal to the laser-diode drive circuit 12 (see Fig. 1). The time point of the leading edge of the pulse is determined by the light-emission start requirement signal, while the width of the pulse is determined by the pulse-width

control signal.

The laser-diode drive circuit 12 activates the laser diode 11 (see Fig. 1) in response to the pulse of the transmission signal so that the laser diode 11 emits a corresponding pulse of the laser light. The time point of the leading edge of the pulse of the laser light is determined by the light-emission start requirement signal, while the width of the pulse of the laser light is determined by the pulse-width control signal. In the case where the step 131 determines the detection of an object in the prescribed short range, since the pulse-width control signal is in the state corresponding to the predetermined small pulse-width (see the step 135), the width of the pulse of the laser light is equal to a small value. On the other hand, in the case where the step 131 determines the non-detection of an object in the prescribed short range, since the pulse-width control signal is in the state corresponding to the predetermined large pulse-width (see the step 133), the width of the pulse of the laser light is equal to the large value. Since the power control signal is in the state corresponding to the normal power (see the step 140), the power of the pulse of the laser light is equal to the normal power. The pulse of the laser light is made into a pulse of the forward laser beam. Since the power of the pulse of the forward laser beam is equal to the normal power, the measurable distance to an object is equal to normal one. Only in the presence of an object spaced from the subject vehicle by equal to or shorter than the normal measurable distance, the comparator 35 (see Fig. 1) outputs a high-level decision signal representing the reception of an echo.

A step 160 following the step 150 derives the measured time interval from the output signal of the time measurement circuit 50. The step 160 calculates the distance to the detected object from the subject vehicle on the basis of the measured time interval and the velocity of light. After the step 160, the current execution cycle of the program segment ends.

A step 120 in Fig. 7 provides a preliminary emission of the laser light. The step 150 in Fig. 7 provides a main emission of the laser light which is executed after the preliminary emission thereof. A set of a preliminary emission of the laser light and a main emission thereof is executed for each of the directions (the angular directions) D1-DN of the transmission of the forward pulse laser beam which form the detection area. Thus, a set of a preliminary emission of the laser light and a main emission thereof is repetitively executed a plurality of times during every cycle or period of the motor drive signal outputted from the microcomputer 90 to the motor drive circuit 18 (see Fig. 1), that is, during every period of the scanning of the detection area by the forward pulse laser beam.

As shown in Fig. 8, the power of the laser light generated by preliminary emissions remains equal to a prescribed low level. In addition, the widths of pulses of the laser light generated by preliminary emissions are equal to the large value. The power of the laser light generated by main emissions remains equal to a normal level. On the other hand, the width of a pulse of the laser light generated by a main emission is changed between the large value